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NLP for Student and Teacher: Concept for an AI based Information Literacy Tutoring System

*A concept presentation by P. Libbrecht, T. Declerck, T. Schlippe, T. Mandl, and D. Schiffner
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Plan

- Information Literacy (IL): definition and teaching methods
- Processes in Information Literacy
- Early-example: Essay Scoring for Short-Answers
- Future work:
 - Which NLP candidates to support coaching
 - How can they be applied?
 - How to build it in a privacy respecting way?

Information Literacy

- From the UNESCO Moscow declaration (2012):

“critical set of competencies to be able to seek, critically evaluate and create new information and knowledge in different forms using existing tools, and share these through various channels”

- recognized essential to take part to the scientific discourse
- recognized useful to be an informed citizens and, thus, effectively fight fake news
- generally taught integrated to a science-oriented course
 - e.g. when asking to find relevant articles
 - e.g. when asking for a data-collection
- Few dedicated courses exist



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Learning and Teaching Information Literacy

- generally taught integrated to a science-oriented course
 - e.g. when asking to find relevant articles
 - e.g. when asking for a data-collection
 - ... classical troubles of *on-the-job-learning*
- Few dedicated courses exist
 - Introduction to scientific work



Learning Processes of the Information Literacy

- use search engines for discovery purposes
 - *search, collect, cite, synthesize*
- create an overview of a given field based on multiple sources
 - *collect, put citations in context, quantify*
- express and justify a personal opinion
 - *collect, differentiate, create, justify*
- Can be done as exercises with evaluation criteria
 - Often discussed among peers
 - Generally scored by a reading teacher

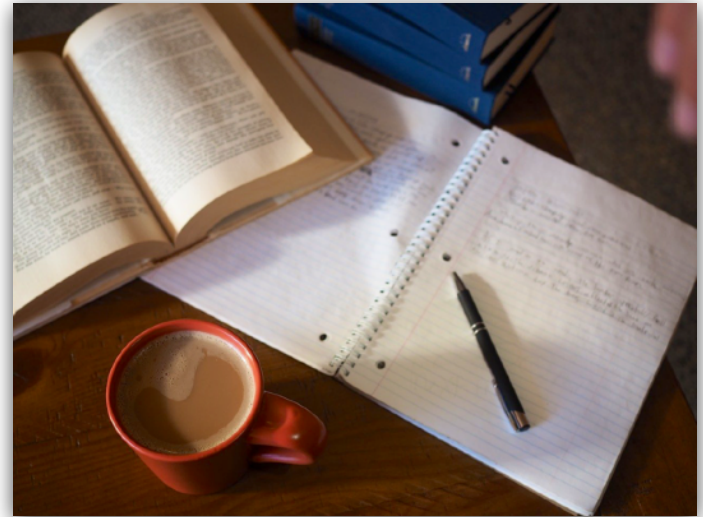


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Early Example of NLP-application: Essay Scoring

- Simple question/mission statement
 - Answer expected as a text
 - Use a set of scored texts
 - Train a model on this
 - Neural network, singular vector decomposition matrix, ...
 - Adjust parameters using cross-validation
- Apply model to suggest score (e.g. Camus & Filighera 2020)
 - but could give more info!
 - E.g. similar documents, highlight words or words complexes
 - Paradigm shift from "raw scorer" to "teacher support"

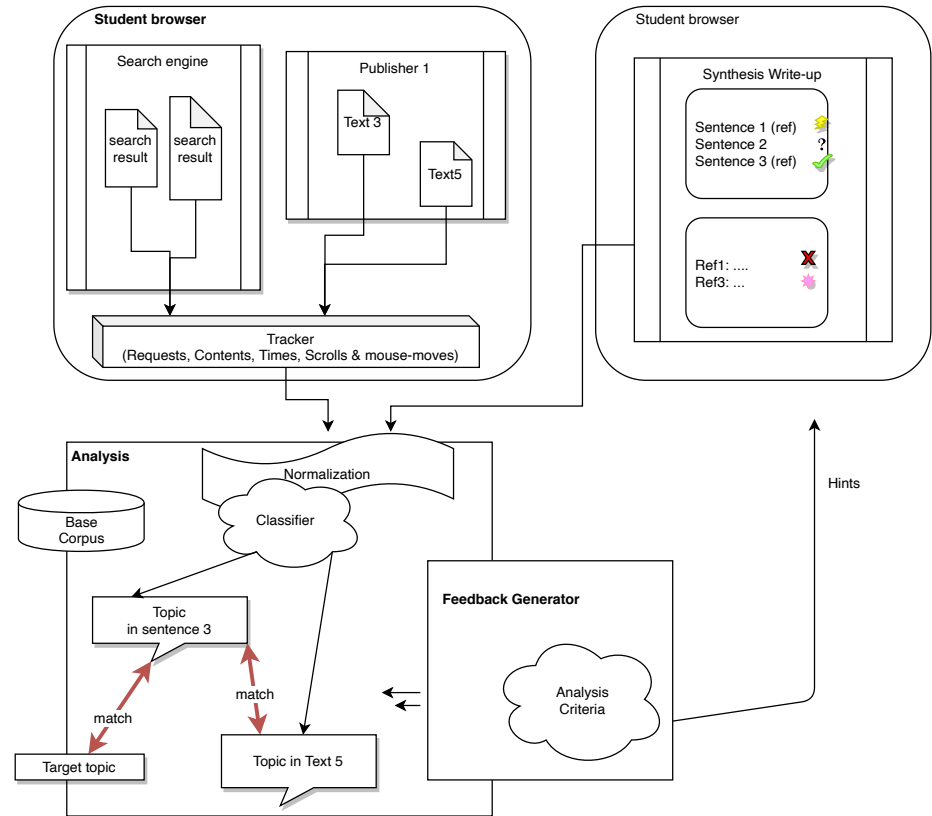
NLP-Methods applicable to IL Teaching

- e.g. when using a search-engine to discover content
 - gather traces with search history, shown results and written recollection
 - recommend further search or further readings
 - give hints referring to shortly visited web-views
 - effectively recognized mentions based on a few words
 - relevance of reported findings with similarity to target topics
 - e.g. using entity linking
- simple formal checks can apply (e.g. citation style) and yield guidance
- closed world or open world



An Architecture to Support IL Teaching

- First implementation:
 - browser-plugin that follows search, read, and write activities
 - precise tasks with closed or opened corpora
 - hints within the search, read and write pages
- within explicit IL courses
 - need exact task spec to devise hints engine
- privacy
 - data-store independent per learner
 - claim: all will be convertible into JavaScript in-web-page code



Conclusion

- We have presented a model to enrich IL learning with automated hints
 - for students and for teachers
 - many can be brought into a community chatbot
- Which methods? NLP algorithms are here
- How to apply them?
 - Frames such as IUBH *Scientific Work* or the *Information-Literacy-Online-MOOC* courses
 - Development of a pilot needs expertise
 - to devise a precise analysis and hints generation
 - to develop processing, UIs, corpora in a task-specific manner

Bibliography

- Unesco (2012), *The Moscow Declaration on Media and Information Literacy*, http://ifapcom.ru/files/News/Images/2012/mil/Moscow_Declaration_on_MIL_eng.pdf (accessed 2020)
- Camus, Leon, Filighera, Anna (2020), *Investigating Transformers for Automatic Short Answer Grading*. AIED, 43-48

Thank you